

Material Groups

Recommended Machining Conditions

ISO	Material	Condition	Tensile Strength [N/mm ²]	Hardness HB	Mtl. No.	V m/min	SUMOCHAM															
							Feed vs. Drill Diameter															
							D=4-4.9	D=5-5.9	D=6-7.9	D=8-9.9	D=10-11.9	D=12-13.9	D=14-15.9	D=16-19.9	D=20-25.9	D=26-32.9						
mm/rev																						
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	80-110-140															
		>= 0.25 %C	Annealed	650	190	2	80-105-130	0.04	0.07	0.09	0.12	0.15	0.18	0.20	0.25	0.25	0.30					
		< 0.55 %C	Quenched and tempered	850	250	3	80-100-120	0.06	0.09	0.11	0.17	0.21	0.24	0.27	0.35	0.35	0.40					
		>= 0.55 %C	Annealed	750	220	4	70-90-110	0.08	0.11	0.13	0.22	0.28	0.30	0.35	0.45	0.45	0.50					
			Quenched and tempered	1000	300	5	50-70-90															
	Low alloy steel and cast steel (less than 5% of alloying elements)	Annealed		600	200	6	80-100-120	0.04	0.07	0.09	0.12	0.14	0.16	0.18	0.23	0.25	0.30					
		Quenched and tempered		930	275	7	70-90-110	0.06	0.10	0.12	0.18	0.21	0.24	0.26	0.31	0.35	0.40					
				1000	300	8	50-70-90	0.08	0.13	0.15	0.25	0.28	0.32	0.35	0.40	0.45	0.50					
				1200	350	9	40-55-70															
	High alloyed steel, cast steel, and tool steel	Annealed		680	200	10	50-70-90	0.06	0.07	0.09	0.12	0.12	0.15	0.18	0.20	0.22	0.25					
		Quenched and tempered		1100	325	11	40-60-80	0.07	0.09	0.11	0.16	0.17	0.20	0.23	0.25	0.27	0.30					
	Stainless steel and cast steel	Ferritic/martensitic		680	200	12	40-55-70	0.05	0.06	0.08	0.10	0.12	0.14	0.16	0.16	0.18	0.20					
		Martensitic		820	240	13	40-55-70	0.06	0.07	0.09	0.12	0.15	0.17	0.20	0.21	0.24	0.27					
M	Stainless steel	Austenitic		600	180	14	30-50-70	0.05	0.06	0.08	0.10	0.12	0.14	0.16	0.16	0.18	0.20					
								0.06	0.07	0.09	0.12	0.15	0.17	0.20	0.21	0.24	0.27					
K	Grey cast iron (GG)	Ferritic/pearlitic			180	15	90-125-160															
		Pearlitic						260	16	80-110-140												
	Nodular cast iron (GGG)	Ferritic			160	17	90-135-180	0.04	0.10	0.12	0.15	0.20	0.25	0.30	0.35	0.35	0.40					
		Pearlitic						250	18	80-110-140	0.06	0.13	0.15	0.22	0.27	0.32	0.37	0.45	0.47	0.50		
	Malleable cast iron	Ferritic			130	19	90-125-160	0.08	0.15	0.18	0.30	0.35	0.40	0.45	0.55	0.60	0.60					
		Pearlitic						230	20	80-110-140												
N	Aluminum-wrought alloy	Not cureable			60	21	90-155-220															
		Cured						100	22													
	Aluminum-cast, alloyed	<=12% Si	Not cureable			75	23	90-155-220														
			Cured						90	24												
		>12% Si	High temperature			130	25	80-120-160				0.20	0.25	0.30	0.35	0.40	0.45	0.50				
										0.35	0.40	0.45	0.50	0.60	0.70	0.75						
	Copper alloys	>1% Pb	Free cutting			110	26	90-155-220														
			Brass						90	27												
			Electrolytic copper						100	28												
	Non-metallic	Duroplastics, fiber plastics					29															
Hard rubber			30																			
S	High temp. alloys	Fe based	Annealed			200	31	30-45-60														
			Cured						280	32												
		Ni or Co based	Annealed			250	33	20-35-50				0.05	0.06	0.08	0.10	0.12	0.12	0.14	0.16			
			Cured						350	34												
			Cast						320	35												
	Titanium Ti alloys			RM 400			36	20-35-50				0.05	0.06	0.08	0.10	0.12	0.14	0.16	0.18			
Alpha+beta alloys cured				RM 1050					37				0.06	0.09	0.11	0.14	0.16	0.18	0.20	0.22		
H	Hardened steel	Hardened			55 HRC	38	20-35-50				0.05	0.06	0.08	0.10	0.12	0.14	0.16	0.18				
		Hardened						60 HRC	39				0.06	0.09	0.11	0.14	0.16	0.18	0.20	0.22		

- When using external coolant supply only, reduce cutting speed by 10%.
- Use internal coolant supply when machining austenitic stainless steel.
- When using more than 5XD drill ratio, reduce cutting parameters by 10%.
- Recommended cutting data
- Machining Stainless Steel is not recommended with QCP & HCP geometry

As a starting value, the middle of the recommended machining range should be used. Then, according to the wear results, conditions can be changed to optimize performance. The data refers to IC908